AMENDMENTS TO THE CLAIMS

Please find below a listing of claims that will replace all prior versions, and listings, of claims in the application:

1. – 3. (cancelled)

4. (currently amended) An apparatus ~~as defined in claim 3, wherein~~ for treating a substrate sensitive to electromagnetic radiation, comprising;

a) a first mask for conditioning a first beam of electromagnetic radiation and producing a first conditioned beam of electromagnetic radiation;

b) a second mask for conditioning a second beam of electromagnetic radiation and producing a second conditioned beam of electromagnetic radiation;

the first and the second conditioned beams of electromagnetic radiation being characterized in that, when they are directed toward the substrate sensitive to electromagnetic radiation, a treatment area of the substrate sensitive to electromagnetic radiation is exposed to electromagnetic radiation, the treatment area including:

- a first portion exposed to only one of the first and the second conditioned beams of electromagnetic radiation; and
- a second portion exposed to both the first and the second conditioned beams of electromagnetic radiation to create an interference pattern over the second portion;

the first and the second conditioned beams of electromagnetic radiation inducing an index of refraction change in the substrate sensitive to electromagnetic radiation, the index of refraction of the substrate sensitive to electromagnetic radiation being modified differently over the first portion than over the second portion, the index of refraction being altered substantially uniformly over the first portion, the index of refraction [[~~is~~]] being altered in a non-uniform manner over the second portion.

5. (original) An apparatus as defined in claim 4, wherein the substrate sensitive to electromagnetic radiation is a waveguide.

6. (original) An apparatus as defined in claim 5, wherein the index of refraction changes periodically over the second portion.

7. (original) An apparatus as defined in claim 6, wherein the second portion forms a Bragg grating.

8. (original) An apparatus as defined in claim 7, wherein the Bragg grating has an apodization.

9. (original) An apparatus as defined in claim 8, wherein the apodization is a Gaussian apodization.

10. (original) An apparatus as defined in claim 9, wherein the index of refraction is altered substantially uniformly over the first portion to form a base value, the Gaussian apodization being symmetrical on either side of the base value.

11. (original) An apparatus as defined in claim 10, wherein the waveguide defines an electromagnetic radiation propagation axis, the Gaussian apodization forming an amplitude profile of the Bragg grating along the electromagnetic radiation propagation axis.

12. (original) An apparatus as defined in claim 5, wherein the waveguide is an optical fiber.

13. (previously presented) An apparatus as defined in claim 12, wherein the first beam of electromagnetic radiation and the second beam of electromagnetic radiation belong to different diffractive orders.

14. (previously presented) An apparatus as defined in claim 13, comprising a source of electromagnetic radiation from which are derivable the first and the second beams of electromagnetic radiation.

15. (original) An apparatus as defined in claim 14, comprising a diffractive mask subjected to exposition of electromagnetic radiation by the source of electromagnetic radiation to produce the first and the second beams of electromagnetic radiation.

16. (previously presented) An apparatus as defined in claim 15, including an optical system to focus the first and the second conditioned beams of electromagnetic radiation toward the optical fiber.

17. (original) An apparatus as defined in claim 16, wherein said source of electromagnetic radiation is coherent.

18. (original) An apparatus as defined in claim 17, wherein the coherent electromagnetic radiation is a UV laser.

19. (currently amended) A substrate sensitive to electromagnetic radiation having an index of refraction modified by the apparatus defined in claim [[~~1~~]] 4.

20. – 22. (cancelled)

23. (currently amended) A method ~~as defined in claim 22, wherein~~ for inducing a modification of the index of refraction of a substrate sensitive to electromagnetic radiation, comprising;

a) conditioning with a first mask a first beam of electromagnetic radiation and producing a first conditioned beam of electromagnetic radiation;

b) conditioning with a second mask a second beam of electromagnetic radiation and producing a second conditioned beam of electromagnetic radiation;

c) directing the first and the second conditioned beams of electromagnetic radiation toward the substrate sensitive to electromagnetic radiation to expose a treatment area of the substrate to electromagnetic radiation, the treatment area including:

- a first portion exposed to only one of the first and the second conditioned beams of electromagnetic radiation; and
- a second portion exposed to both the first and the second conditioned beams of electromagnetic radiation to create an interference pattern over the second portion;

the index of refraction of the substrate sensitive to electromagnetic radiation being modified differently over the first portion than over the second portion, the index of refraction being altered substantially uniformly over the first portion, the index of refraction [[~~is~~]] being altered in a non-uniform manner over the second portion.

24. (previously presented) A method as defined in claim 23, wherein the substrate sensitive to electromagnetic radiation is a waveguide.

25. (original) A method as defined in claim 24, wherein the index of refraction changes periodically over the second portion.

26. (original) A method as defined in claim 25, wherein the second portion forms a Bragg grating.

27. (original) A method as defined in claim 26, wherein the Bragg grating has an apodization.

28. (original) A method as defined in claim 27, wherein the apodization is a Gaussian apodization.

29. (original) A method as defined in claim 28, wherein the index of refraction is altered substantially uniformly over the first portion to form a base value, the Gaussian apodization being symmetrical on either side of the base value.

30. (original) A method as defined in claim 29, wherein the waveguide defines an electromagnetic radiation propagation axis, the Gaussian apodization forming an amplitude profile of the Bragg grating along the electromagnetic radiation propagation axis.

31. (original) A method as defined in claim 24, wherein the waveguide is an optical fiber.

32. (previously presented) A method as defined in claim 31, wherein the first beam of electromagnetic radiation and the second beam of electromagnetic radiation belong to different diffractive orders.

33. (previously presented) A method as defined in claim 32, comprising providing a source of electromagnetic radiation from which is derived the first and the second beams of electromagnetic radiation.

34. (previously presented) A method as defined in claim 33, comprising providing a diffractive mask exposed to electromagnetic radiation by the source of electromagnetic radiation to produce the first and the second beams of electromagnetic radiation.

35. (previously presented) A method as defined in claim 34, including providing an optical system to focus the first and the second conditioned beams of electromagnetic radiation toward the optical fiber.

36. (original) A method as defined in claim 35, wherein said source of electromagnetic radiation is coherent.

37. (original) A method as defined in claim 36, wherein the coherent electromagnetic radiation is a UV laser.

38. (currently amended) A substrate sensitive to electromagnetic radiation processed by the method defined in claim [[~~20~~]] 23.

39. – 47. (cancelled)

48. (currently amended) A method for inducing a modification of the index of refraction of a substrate sensitive to electromagnetic radiation, said method comprising:

a) generating a first beam of electromagnetic radiation and a second beam of electromagnetic radiation different from the first beam of electromagnetic radiation;

b) directing the first and the second beams of electromagnetic radiation toward the substrate sensitive to electromagnetic radiation to expose a treatment area on the substrate to electromagnetic radiation, the first and the second beams of electromagnetic radiation being such that the treatment area includes:

- a first portion exposed to only one of the first and the second beams of electromagnetic radiation; and
- a second portion exposed to both the first and the second beams of electromagnetic radiation to create an interference pattern over the second portion;

the index of refraction of the substrate sensitive to electromagnetic radiation being modified differently over the first portion than over the second portion, the index of refraction being altered substantially uniformly over the first portion, the index of refraction being altered in a non-uniform manner over the second portion.

49. (currently amended) An apparatus as defined in claim [[~~1~~]] 4, wherein the first and the second conditioned beams of electromagnetic radiation induce a predetermined gaseous profile in the substrate.

50. (original) An apparatus as defined in claim 49, wherein the gaseous profile is a hydrogen profile.

51. (currently amended) An apparatus as defined is claim [[1]] 4, wherein said first mask imparts a first cross-sectional shape to the first beam of electromagnetic radiation, said second mask imparts a second cross-sectional shape to the second beam of electromagnetic radiation, the first cross-sectional shape being different from the second cross-sectional shape.

52. (original) An apparatus as defined in claim 51, wherein said first mask imparts a phase shift to the first beam of electromagnetic radiation.

53. – 67. (cancelled)